WHAT IS CLAIMED IS

      1.   A method for improving the useful dynamic range of a radar, said method comprising the steps of:

      generating a first transmit waveform which is controllable in at least one of amplitude and phase as a function of time;

      transmitting said first transmit waveform toward a region;

      receiving a return from said region to thereby generate first received signals; and

      controlling a subsequent transmit waveform by the steps of;

      (a) comparing said first transmitted and first received signals by deconvolution to thereby generate a clutter kernel which is a representation of return clutter arising as a result of said first transmit waveform;

      (b) using said clutter kernel to predict the return which would be received from an alternate transmit waveform; and

      (c) comparing the variation in the clutter return between said first transmit waveform and said alternate transmit waveform to determine a succeeding waveform which should be used for a succeeding transmission.

2.   A method according to claim 1, wherein said step of controlling a subsequent transmit waveform is performed in a manner allowing each said generating step to be independently controlled.

3.   A method according to claim 1, wherein said comparing step includes the step of selecting for said succeeding waveform that one of said first and alternate transmit waveforms which exhibits return clutter having the lower variation.

4.   A method according to claim 3, further comprising the steps of:
    transmitting said succeeding waveform;
    receiving a succeeding return resulting from transmission of said succeeding waveform, and
    controlling a subsequent transmit waveform by the steps of;
        (a) comparing said succeeding transmitted and succeeding received signals by deconvolution to thereby generate a clutter kernel which is a representation of return clutter arising as a result of said succeeding transmit waveform;
        (b) using said clutter kernel to predict the return which would be received from a further alternate transmit waveform; and
        (c) comparing the variation in the

clutter return between said succeeding transmit
waveform and said further alternate transmit
waveform to determine a following waveform which
should be used for a further succeeding
transmission.

5.   A method according to claim 1, further
comprising the step of processing said return for
determining at least one the range and direction of said
target.

6.   A method for improving the useful dynamic
range of a radar, said method comprising the steps of:
        generating a plurality of transmit waveforms
which are controllable in at least one of amplitude and
phase as a function of time;
        transmitting said plurality of transmit waveforms
toward a region;
        receiving returns from said region to thereby
generate received signals; and
        controlling subsequent transmit waveforms by the
steps of;
                (a) comparing said transmitted and
        received signals by deconvolution to thereby
        generate a clutter kernel which is a
        representation of return clutter arising as a
        result of said transmit waveforms;

(b) integrating said clutter kernel with previously determined clutter kernels to thereby generate integrated clutter kernels;

(c) obtaining alternative potential transmit waveforms;

(d) using said integrated clutter kernels to predict the clutter return which would be received from at least some of said alternate potential transmit waveform;

(e) determining the quality of the predicted clutter returns; and

(f) comparing the quality of said predicted clutter returns with a standard to determine a succeeding transmit waveform which should be used for a succeeding transmission.

7.   A method according to claim 6, wherein said step of determining the quality of the predicted clutter returns comprises determining the variability of said clutter returns as a function of time.

8.   A method according to claim 6, wherein said step of generating a plurality of transmit waveforms includes the step of accessing a memory preloaded with a plurality of different transmit waveforms.

9.   A method according to claim 6, further comprising the step of processing said return for

determining at least one the range and direction of said target.

    10.   A method for generating a transmit waveform for one of radar, sonar, and lidar, said method comprising the steps of:

    generating a transmit waveform S(f) which is controllable in at least one of amplitude and phase as a function of time;

    transmitting said waveform toward a region which may contain a target;

    receiving a return R(f) from said target;

    processing said return for determining at least one of the range and direction of said target; and

    controlling said transmit waveform by the steps of

    (a) processing the transmitted and received signals by deconvolution to thereby generate a clutter kernel H(f) representation of clutter; and

    (b) predicting the received clutter R'(f) which would be received from an alternate transmit waveform S'(f) by

$$R'(f) = H(f)\ S'(f);\ \text{and}$$

    (c) comparing the variation in the received clutter between said transmit waveform and said alternate transmit waveform to determine which should be used for a succeeding transmission.